VALPEY-FISHER VF

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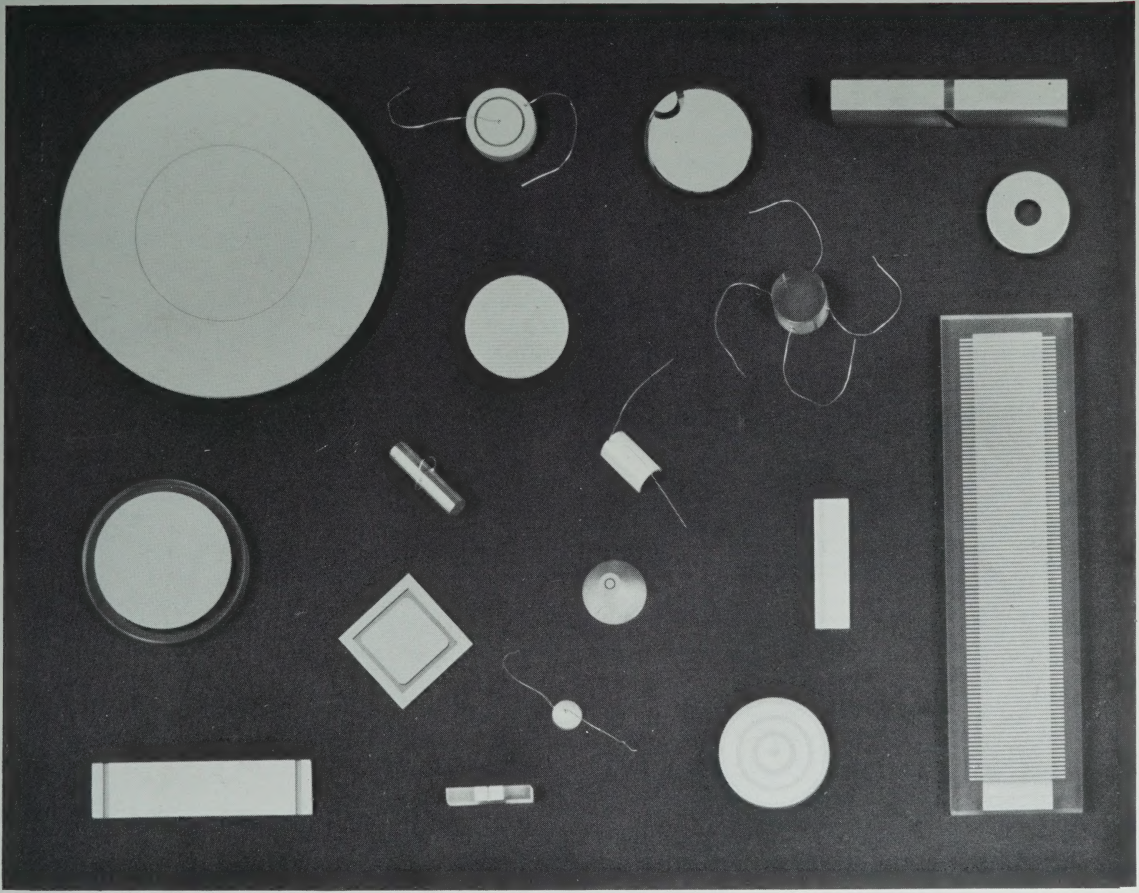
Over four decades of leadership . . .

PIEZOELECTRIC TRANSDUCER CRYSTALS



SINGLE-CRYSTAL QUARTZ, LITHIUM NIOBATE, TOURMALINE, LEAD METANIOBATE, LEAD ZIRCONATE TITANATE AND OTHER SPECIAL PIEZOELECTRIC MATERIALS for. . . .

Medical diagnostic and therapeutic applications ● Acoustic holography ● Non-destructive testing
Surface acoustic wave devices ● Ultrasonic delay lines ● Acousto-optical components
OEM force and pressure measurement ● Property analysis of solids, liquids and gases

PIEZOELECTRIC CRYSTALS AND SERVICES

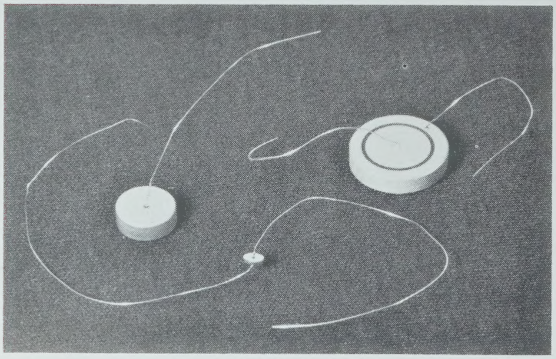
Valpey-Fisher maintains an inventory of quartz, lithium niobate, tourmaline and most of the popular piezo-ceramics from which we fabricate crystals to meet your specific needs. We do not produce materials. Crystals are available to generate or detect compressional, shear, torsional or flexural modes of vibration. We can supply most but not all modes in all materials. Typical fundamental frequencies range from 50 KHz to100 MHz, and our tolerances are ±1 to ±5%, depending on the combination of material, size, shape and frequency. For some combinations, we can match individual crystals to ±0.1%.

We produce round, square and rectangular crystals on a daily basis; as well as triangular, wedged and perforated configurations as requested. Our largest are 4 in. by 8 in. by 1 MHz in quartz, 8 in. diameter in quartz and 4 in. diameter in ceramics; our smallest are 0.020 in. diameter in both quartz and ceramics. Two surface finishes are standard: 3-micron fine lap for fundamental operation, and Valpey-Fisher chemical polish for overtone operation.

Our vacuum-deposited electrodes enable us to achieve optimum frequency match in a variety of patterns. These thin (3,000 A) electrodes maintain the flatness, parallelism and surface quality of the crystal and do not overload thin, high-frequency crystals (5 to 100 MHz). Standard electrodes are chrome/gold, chrome/silver and aluminum.

Soldered wire leads, appropriate to the size and frequency of the crystals, are available. Or we will gladly explain how you can make your own soldered connections to our electrodes.

The skills necessary to produce our transducer crystals are readily applied to the production of related acoustic items, such as wear plates and buffer rods. Our high-quality lapping techniques and our chemically-applied overtone polish provide crystal quartz, fused silica and alumina components with the most damage-free surfaces available.



CONVENTIONAL PATTERNS

with wire leads

(l to r)

Solid electrode with centered lead

Solid electrode with one lead on each surface

Co-axial electrode with both leads on same surface

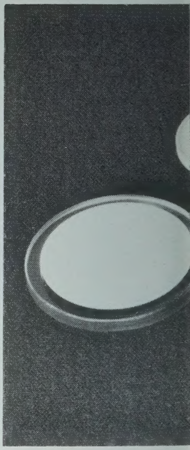
TORSIONAL –

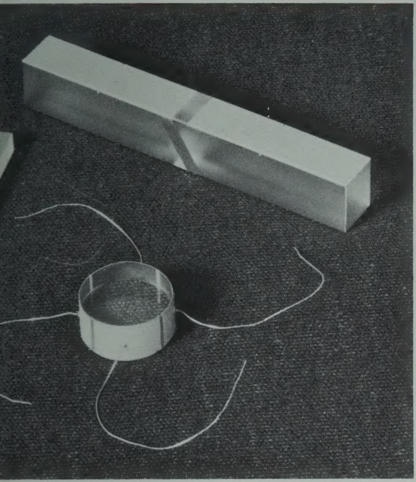
(top) 100 KH

(far left) Torsi

(upper middle

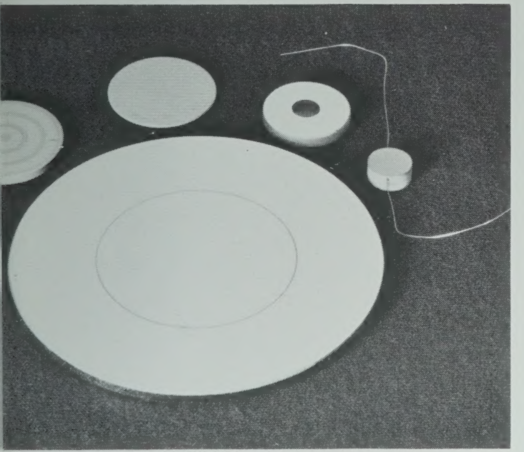
(lower middle)





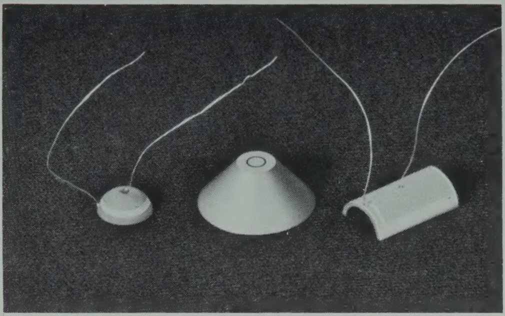
XURAL – LENGTH EXTENSIONAL

cut quartz, chrome/gold electrodes
X-cut quartz with leads
tched to size
KHz 0.5″ dia with four leads



PECIAL PATTERNS

(center) 3″ diameter guard ring
(l to r) Edge hold-back, concentric multi-ring
multi-stripe, bare center, edge tab



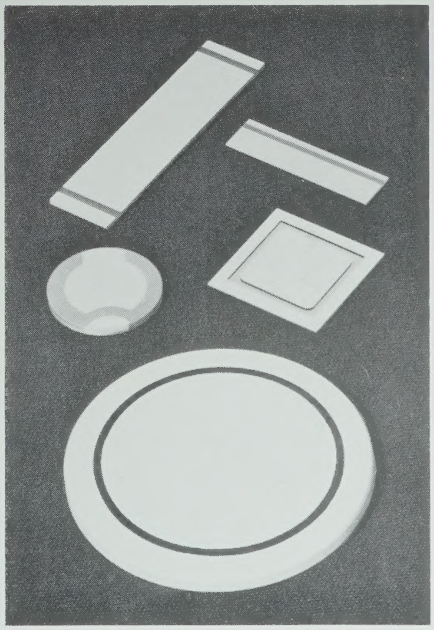
UNIQUE SHAPES

(l to r) Hemisphere with co-axial electrodes and leads, conical Impactducer with guard ring, hemi-cylinder with end overwarp co-axial and leads

CO-AXIAL ELECTRODE

Electrical accessibility to both surfaces with only one surface mechanically visible and/or accessible

(top left) Both ends overwrapped
(upper right) One long edge overwrapped
(left middle) Special custom pattern
(right middle) Square co-axial
(bottom) Narrow gap conventional co-axial



GENERAL SPECIFICATIONS

Material	Frequency Range	Tolerance
Quartz	50 KHz/30 MHz 40 MHz/60 MHz 65 MHz/100 MHz	±1% ±2% ±5%
Lithium Niobate	250 KHz/30 MHz	±1%
Tourmaline	500 KHz/30 MHz	±1%
Ceramics	100 KHz/10 MHz 12 MHz/20 MHz 21 MHz/30 MHz	±1% ±2% ±3%

Diameter, or Length and Width Tolerances: ±0.001 in.

Flatness: To within 0.00002 in. (ceramics 0.00005 in.)

Parallelism: To within 0.00005 in. (ceramics 0.0001 in.)

Finish: Chemically polished for overtone operation

and/or

Fine lapped for fundamental operation

Edges: Round crystals - No. 320 diamond wheel

Rectangular crystals - 15 micron fine lap
(chamfered or beveled on request)

Orientation: As required to produce or detect either shear, compressional, torsional or flexural modes of operation

Size Ranges: Disks up to 8 in. diameter; flat or spherical. Square or rectangular configurations available in proportional sizes

Electrodes: Solid, co-axial or patterns as specified

Electrode Materials: Vacuum deposited chrome/gold, chrome/silver or aluminum

Leads: Soft copper wires of any diameter and length appropriate to the crystal

Marking: Polarity of axis as required. Shear axis is perpendicular to slight flat on edge of round crystals, and along length or width (your choice) of other shapes

Specifications subject to change without notice